

1           1.       In a multi-user communication system defining a radio link upon which both  
2 closed-loop, power-controlled communication services and best-effort communication services  
3 are effectuable thereon between a sending station and at least a first receiving station, an  
4 improvement of apparatus for facilitating allocation of power levels of at least a first best-effort  
5 communication signal communicated upon the radio link pursuant to effectuation of at least a  
6 first best-effort communication service between the sending station and the at least the first  
7 receiving station, said apparatus comprising:

8                   a predictor coupled to receive indicia associated with transmit power levels at  
9 which closed-loop, power-controlled communication signals sent upon the radio link to  
10 effectuate the guaranteed QoS communication services are transmitted, said predictor for  
11 predicting subsequent power levels at which the closed-loop, power-controlled communication  
12 signals shall subsequently be transmitted;

13                   an allocator coupled to said predictor to receive indications of predictions made  
14 thereat, said allocator for allocating the power levels at which subsequently to transmit the at  
15 least the first best-effort communication signal.

1           2.       The apparatus of claim 1 wherein the indicia of the transmit power levels to which  
2 said predictor is coupled to receive comprise indicia associated with prior power levels at which  
3 the closed-loop, power-controlled communication signals have previously been sent upon the  
4 radio link, the subsequent power levels predicted by said predictor responsive, at least in part, to  
5 values of the indicia associated with the prior power levels.

3. The apparatus of claim 2 further comprising a storage element coupled to said predictor, said storage element for storing the indicia associated with the prior power levels, the indicia stored at said storage element accessible to said predictor to predict the subsequent power levels at which the closed-loop, power-controlled communication signals shall be transmitted.

4. The apparatus of claim 3 wherein said allocator is further coupled to receive indicia associated with present power levels at which the closed-loop, power-controlled communication signals are sent, said allocator further for selectably reallocating the power levels at which subsequently to transmit the at least the first best-effort communication signal.

5. The apparatus of claim 4 wherein said allocator reallocates the power levels in manners to reduce the power levels at which subsequently to transmit the at least the first best-effort communication signal.

6. The apparatus of claim 5 wherein the power levels allocated by said allocator at which subsequently to transmit the at least the first best-effort communication signal are related to a ratio of a link allocation interval to a power command control interval.

7. The apparatus of claim 6 wherein the power levels are allocated by said allocator are at least step-wise proportional to the ratio of the link allocation interval to the power command control interval.

1           8.       The apparatus of claim 2 wherein predictions of the subsequent power levels at  
2       which the closed-loop, power-controlled communication signals shall subsequently be  
3       transmitted are made pursuant to an autoregressive process.

1           9.       The apparatus of claim 8 wherein the predictions are successively altered  
2       responsive to successive indicia associated with the prior power levels measured at successive  
3       intervals.

1           10.      The apparatus of claim 9 wherein a plurality of closed-loop, power-controlled  
2       communication signals are concurrently sent upon the radio link to effectuate a plurality of  
3       closed-loop, power-controlled communication services, and wherein predictions made by said  
4       predictor are made responsive to indicia associated with the transmit power levels of each of the  
5       plurality of guaranteed QoS communication signals.

1           11.      The apparatus of claim 10 wherein predictions made by said predictor of the  
2       subsequent power levels at which the closed-loop, power-controlled communication signals shall  
3       subsequently be transmitted comprise predictions of maximum power levels at which each of the  
4       closed-loop, power-controlled communication signals shall subsequently be transmitted.

1           12.      The apparatus of claim 2 wherein the at least the first best-effort communication  
2       signal comprises a plurality of best-effort communication signals and wherein said allocator  
3       allocates the power levels at which subsequently to transmit each of the plurality of the best-  
4       effort communication signals.

1           13.    The apparatus of claim 1 wherein the multi-user communication system  
2 comprises a CDMA (code-division, multiple-access) cellular communication system, wherein  
3 the radio link comprises a downlink, the sending station comprising a base transceiver station  
4 forming part of a system network, and the at least the first receiving station comprising a first  
5 mobile station and at least a second mobile station, and wherein said predictor and said allocator  
6 is positioned at the system network of the CDMA cellular communication system.

1           14.    The apparatus of claim 13 wherein the closed-loop, power-controlled  
2 communication signals sent upon the down link to effectuate the closed-loop, power-controlled  
3 services are power-controlled pursuant to a closed-loop power control scheme, wherein the at  
4 least the first best-effort communication signal comprises at least a first time-multiplexed signal  
5 sent on a shared channel defined upon the forward link and wherein said allocator allocates the  
6 power levels at which subsequently to transmit the at least the first time-multiplexed signal.

1           15.     In a method for communicating in a multi-user communication system defining a  
2 radio link upon which both closed-loop, power-controlled communication services and best-  
3 effort communication services are effectuable thereon between a sending station and at least a  
4 first receiving station, an improvement of a method for facilitating allocation of power levels of  
5 at least a first best-effort communication signal communicated upon the radio link pursuant to  
6 effectuation of at least a first best-effort communication service between the sending station and  
7 the at least the first receiving station, said method comprising:

8                     detecting indicia associated with transmit power levels at which closed-loop,  
9 power-controlled communication signals sent upon the radio link to effectuate the closed-loop,  
10 power-controlled communication services are transmitted;

11                     predicting subsequent power levels at which the closed-loop, power-controlled  
12 communication signals shall subsequently be transmitted responsive to detections made during  
13 said operation of detecting and

14                     allocating the power levels at which subsequently to transmit the at least the first  
15 best-effort communication signal responsive to predictions made during said operation of  
16 predicting.

1           16.     The method of claim 15 wherein the indicia detected during said operation of  
2 detecting comprise indicia associated with prior power levels at which the closed-loop, power-  
3 controlled communication signals have previously been sent upon the radio link.

1           17.    The method of claim 16 wherein predictions made during said operation of  
2    predicting are responsive, at least in part, to values of the indicia associated with the prior power  
3    levels.

1           18.    The method of claim 17 wherein said operation of predicting comprises  
2    performing an auto-regression procedure upon indicia of successive prior power levels.

1           19.    The method of claim 16 further comprising the operation of selectably  
2    reallocating the power levels allocated during said operation of allocating, thereby to reduce  
3    selectably the power levels.

1           20.    The method of claim 16 wherein the power levels allocated during said operation  
2    of allocating are related to a ratio of a link allocation interval to a power control interval.